EPA
Region I, New England

Superfund Program ◘ **July 2005**

Proposed Plan

W.R. Grace Superfund Site
Acton and Concord, MA

The Cleanup Proposal At A Glance...

After careful and extensive studies of impacts from the contamination at the W. R. Grace Superfund site over the last seven years, EPA proposes the following clean up plan to reduce unacceptable risk(s) and future potential unacceptable risk from site contamination:

- Cleanup of contaminated sediments and soils posing an unacceptable risk to human health and/or the environment in Sinking Pond and the North Lagoon Wetlands.
- Extraction and treatment of groundwater contamination in the Southeast and Southwest Industrial Landfill areas on the Grace property. Construction of an approximately 200 gallon per minute groundwater pump and treatment system. Treatment processes for extracted groundwater would include air stripping, activated carbon (air treatment), and metals precipitation prior to surface water discharge to Sinking Pond.
- Monitored natural attenuation and/or enhanced flushing of areas of groundwater contamination not captured by the extraction system.

Information Session
7:30 p.m.
(6:30- Poster Session)
Tuesday, July 19, 2005
Selectmen's Meeting Room,
Acton Town Hall
Main Street
Acton, MA

Formal Public Hearing
Thursday, August 4, 2005
7 pm
(same location as above)

- Institutional Controls such as deed restrictions and/or local ordinances to prevent unacceptable exposures to contaminated groundwater until cleanup levels are met and to protect against unacceptable future exposures to any wastes left in place on-site.
- Long-term groundwater, surface water, and sediment monitoring, and periodic five-year reviews of the remedy.
- Estimated Total Costs for EPA's preferred clean-up alternatives is $16.9 million

After careful consideration of the nature and extent of contamination as well as an in-depth review of extensive groundwater modeling conducted for this Site, EPA has elected not to propose active extraction and treatment of groundwater contamination northeast of the Grace property (See figure 2). A further discussion of this issue can be found on page 12. Groundwater from this northeast area is currently being treated with by an air stripper system that is operated by the Acton Water District (AWD). The AWD continues to treat and provide safe drinking water to the residents of Acton.

A closer look at the proposed cleanup plan is on pages seven through twelve.

W.R. Grace Site History

1945-1954: Dewey & Almy Chemical Company manufactures various products at the Acton site at various times including latex, resins, plasticizers, and paper battery separators
1954-1991: W. R. Grace acquires Dewey & Almy and continues various chemical manufacturing processes at the Acton site
1978: Organic contaminants (vinylidene chloride, vinyl chloride, ethylbenzene, and benzene) detected in municipal wells (Assabet #1 and #2)
1980: W. R. Grace and EPA enter into a Consent Decree to cleanup waste disposal areas and restore groundwater to a fully useable condition
1983: Site added to the Superfund National Priorities List (NPL)
1984: As part of an agreement between the AWD and W.R. Grace, a treatment system to remove VOC's was added to the public water supply system.
1985: As required by the Consent Decree, an Aquifer Restoration System (ARS) is constructed and begins cleaning up contaminated groundwater
1989: EPA signs first Record of Decision for the site; this Record of Decision included a frame work to address all areas of the site by dividing the site into three Operable Units: Operable Unit 1 soil contamination; Operable Unit 2 residual soil contamination; and Operable Unit 3 groundwater contamination focusing on an evaluation of the existing ARS; this first Record of Decision also included a cleanup plan to address soil and residual soil contamination at the site (Operable Units 1 and 2)
1994: Soil cleanup begins
1997: Soil cleanup completed
1998: Remedial Investigation/Feasability study (RI/FS), ecological and human health risk assessments initiated for Operable Unit 3
1999: EPA prepares first 5-year clean up review; finds past clean up is protective
2004: EPA prepares second 5-year clean up review; finds past clean up is protective
2005: RI/FS and risk assessment reports released, EPA proposes cleanup plan for Operable Unit 3

Why is Cleanup up needed?

The W. R Grace (Acton Plant) Superfund site consists of 260+ acres of land in the towns of Acton & Concord, Massachusetts. The Grace site is bordered by residential property on the northwest, east, and west, and industrial properties to the south and northeast. W. R. Grace is the current owner of the site and is the responsible party for performing site work, investigations, and cleanup, under EPA and Massachusetts Department of Environmental Protection (MADEP) oversight.

Former owners of the Grace property include American Cyanamid Company, which manufactured explosives, and the Dewey & Almy Chemical Company (Dewey & Almy). Dewey & Almy acquired the property in 1946 and manufactured synthetic rubber container sealant products. An organic chemical plant that produced latex products, plasticizers, and resins began operating in 1949, and a paper battery separator production facility was constructed in 1951.

Grace acquired Dewey & Almy in1954, and chemical operations were continued at the property. Grace produced materials used to make concrete additives, organic chemicals, container sealing compounds, latex products, and paper and plastic battery separators. Wastewater from the manufacturing processes were disposed of in several on-site lagoons and solid industrial wastes were disposed of in an on-site landfill. In addition, the by-products of some chemical processes were disposed of in what is referred to as the Blowdown Pit in the central portion of the property. Discharge or disposal to these areas ceased in 1980, and organic chemical production at the Grace property ended in 1982.

In 1997, over 170,000 cubic yards of contaminated soil and sludge were removed, thermally treated, mixed with cement then placed and covered in the Industrial Landfill as required by the 1989 Record

of Decision (first ROD) for Operable Units 1 and 2. This Record of Decision also laid out the frame work for future cleanup work at the site, including groundwater. Because the on-site Aquifer Restoration System (ARS) had been in operation cleaning up groundwater for a number of years, the focus of Operable Unit 3 was on addressing contaminated groundwater that was not being contained or adequately addressed by the ARS. In addition, surface water bodies and sediments were also included in Operable Unit 3. The ARS has pumped over 4.1 billion gallons of contaminated groundwater and removed over 6,195 pounds of total VOCs from 1985 to 2004.

The Remedial Investigation Report for Operable Unit 3 defined the horizontal and vertical nature and extent of groundwater, surface water and sediment contamination at the site. Contaminated groundwater extends from the Grace property northerly to Fort Pond Brook, northeasterly to Fort Pond Brook and the Acton Water District School Street Wellfield, and south to the Assabet River. Fort Pond Brook and the Assabet River are discharge boundaries for contaminated groundwater that originates from the Grace property.

Some of the primary contaminants in groundwater are volatile organic compounds (VOCs), including vinyl chloride, benzene, and vinylidine chloride (VDC) - also known as 1, 1 dichloroethene. Inorganic metals such as arsenic, iron and manganese are also present in groundwater. Some of these inorganics are naturally occurring due to the natural geology of the region. However, the disposal of VOCs on the Grace property may have caused these naturally occurring metals to be mobilized from the rock into groundwater. See Figure 3. In addition, high levels of arsenic and manganese were found in the sediments in Sinking Pond and the North Lagoon Wetlands. High levels of manganese were also found in the sediment in the North Lagoon.

Human health and ecological risk assessments have been prepared to determine if and where there are current or potential future unacceptable risk(s) at the site from exposure to contamination based upon a number of circumstances or exposure scenarios.

The human health exposure scenarios considered were as follows:

- Current Landscaper (irrigation water)
- Future Resident (drinking untreated tap water)
- Future Resident (incidental ingestion and dermal contact from untreated private irrigation water, i.e., irrigation water used to fill a swimming pool or landscape watering)
- Future Resident (inhalation of indoor air from dwelling located over contamination)
- Future Construction Worker (exposure to groundwater in a trench)
- Current and Future Recreational User (future swimmer/wader).

This evaluation determined that site contamination poses unacceptable future risks for the following scenarios:

- Future Resident (at risk from drinking untreated tap water)
- Future Resident (at risk from incidental ingestion and dermal contact from untreated private irrigation water i.e., irrigation water used to fill a swimming pool or landscaping watering)
- Future Recreational User (at risk from swimming/wading in North Lagoon Wetlands and Sinking Pond)
- Current adult workers dermal contact and inhalation of irrigation water from Powder Point Plaza

It is important to note that these are **future** unacceptable risks, as the Town of Acton's water is treated to safe levels by the Acton Water District prior to being provided to residents for drinking water. The Town of Acton has also imposed a temporary moratorium on the installation of irrigation wells in the area of contaminated groundwater to prevent potential unacceptable risks from exposure.

The ecological risk assessment evaluated risks to aquatic organisms, animals and other ecological receptors that could be exposed to contamination. The ecological risk assessment concluded that there is an unacceptable risk to the environment posed by sediments and wetland soils contaminated with arsenic and or manganese in portions of Sinking Pond and the North Lagoon Wetlands, both on the Grace property.

Based on the findings of the Remedial Investigation and Human Health and Ecological risk assessments, a Feasibility Study was then drafted to examine potential options for cleanup to address the unacceptable risks outlined above. This Proposed Plan outlines EPA's preferred alternative for that cleanup.

Why Does EPA Recommend this Proposed Cleanup Plan?

Based on the results of the Remedial Investigation and the Human Health and Ecological risk assessments, EPA has reviewed the Feasibility Study and recommends this proposed cleanup plan for the cleanup of contaminated groundwater and sediments at the W.R. Grace site because EPA believes that it achieves the best balance among EPA's nine criteria used to evaluate various alternatives. (See page 14 for a list of the nine criteria used).

The proposed plan is protective of both human health and the environment while, at the same time, is cost effective. This cleanup plan provides both long and short term protection to human health and the environment, attains all Federal and State applicable or relevant and appropriate environmental requirements (ARARs), reduces toxicity, volume and/or mobility of contaminants through treatment of contaminated groundwater and excavation and removal or capping of contaminated sediments and wetland soils, and utilizes permanent solutions to the maximum extent practicable by removing and/or capping contaminated sediments and wetland soils, capturing and treating contaminated groundwater, enhancing flushing, and using institutional controls to prevent unacceptable exposures in the future.

Why is this Proposed Cleanup Plan different from typical cleanup proposals in the Superfund Program?

As discussed earlier, pursuant to a Consent Decree entered by the court under another environmental law, the Resource Conservation and Recovery Act, a groundwater cleanup system (the ARS) was constructed and has been in operation since 1985 to address contaminated groundwater from the Grace property. Typically cleanup decisions under the Superfund law are made before any cleanup work has occurred. In this case, extensive and successful groundwater cleanup has occurred at the site over a 20 year period. Included with this Proposed Plan are two maps which detail the reduction in contaminant concentrations during this 20 year time frame.

Note that the 1984 map does not show groundwater contamination in the Northeast Area. (See Figures 1 and 2) This is because extensive groundwater sampling was not conducted in this area until several years later. However, it should be assumed, based on the limited number of samples taken in that time frame, that extensive and high level contamination existed in this area in the early 1980s.

The first ROD was written with this in mind and, as a result, focused the investigation and development of alternatives on the evaluation of the ARS to determine if it is adequately containing contaminated groundwater from the site and adequately remediating the groundwater effected by the site. In light of the significant reduction in contaminant concentrations through out the areas affected by Grace contamination, EPA's focus was on maximizing, and to the extent required, redesigning the ARS to optimize its effectiveness in the final years of the groundwater cleanup rather than evaluating groundwater as if no cleanup had yet occurred.

What impacts would the cleanup have on the local community?

The proposed cleanup plan could potentially have the following impacts on the community:

Air Quality:

Excavation and/or capping will be required in Sinking Pond and the North Lagoon Wetlands. Any option that disturbs the wastes during clean up has the potential to present short term risks during the excavation and or construction activities. Air monitoring will be performed to protect workers and ensure that the surrounding neighborhood air quality is not impacted. Dust suppression methods will be employed as necessary.

Truck Traffic:

Excavated materials (sediments and wetland soils) may be shipped off-site for disposal via trucks. Also, building materials and process equipment for construction of the on-site groundwater treatment facility will be brought to the site by trucks. EPA will work with the community to determine the best routes for minimizing traffic concerns and will notify the community before cleanup activities begin.

Other Considerations:

This proposed groundwater cleanup plan provides far fewer adverse construction impacts to the community than some other options considered. All groundwater extraction well piping and treatment facilities are expected to remain on W. R. Grace property. A more extensive groundwater extraction and/or reinjection network could likely have necessitate the construction of additional wells, pumps, and piping in public streets, right-of-ways, and properties not owned by parties other than W. R. Grace. In addition to the technical analysis of the groundwater flow model, minimizing the short-term impacts to the community was also a consideration in crafting EPA's preferred alternative.

Impacts to the Flood Plain and Wetlands:

Section 404 of the Clean Water Act and Executive Order 11990 (Protection of Wetlands) require a determination that there is no practical alternative to taking federal actions in a wetland area. Sediments in both the wooded swamp and sedge marsh area of the North Lagoon Wetlands pose unacceptable human health and/or ecological risk. Through its analysis of the data collected in the RI as well as evaluations in the human health and ecological risk assessments, EPA has determined

that because significant high level contamination exists in the North Lagoon Wetlands, there is no practical alternative to conducting work in the wetlands.

Once EPA determines that there is no practical alternative to conducting work in wetlands, EPA is then required to minimize potential harm or avoid adverse effects to the extent practicable. The proposed alternative for the North Lagoon Wetlands requires excavation and removal of sediments that pose an unacceptable risk. These contaminated sediments may be taken off-site for disposal or they may be excavated from the wooded swamp, consolidated within the sedge marsh and capped to prevent exposure. If these sediments remain on-site, this alternative would require restoring and enlarging the wooded swamp area wetland and covering of the sedge marsh in the North Lagoon Wetlands. The wooded swamp area would need to be enlarged and restored to account for the sedge marsh area being capped. Although covering or filling wetland areas is generally disfavored in the analysis of minimizing impacts, because the wooded swamp has significantly greater habitat value when compared to the sedge marsh, total on-site adverse impacts would be greatly minimized by enlarging and restoring the wooded swamp rather than restoring the sedge marsh (a low value wetlands).

Best management practices will be used throughout the site to minimize adverse impacts on the wetlands, wildlife or its habitat. Damage to these wetlands will be mitigated through erosion control measures and proper re-grading and re-vegetation

Figure 1. Distribution of VDC in Groundwater, 1984

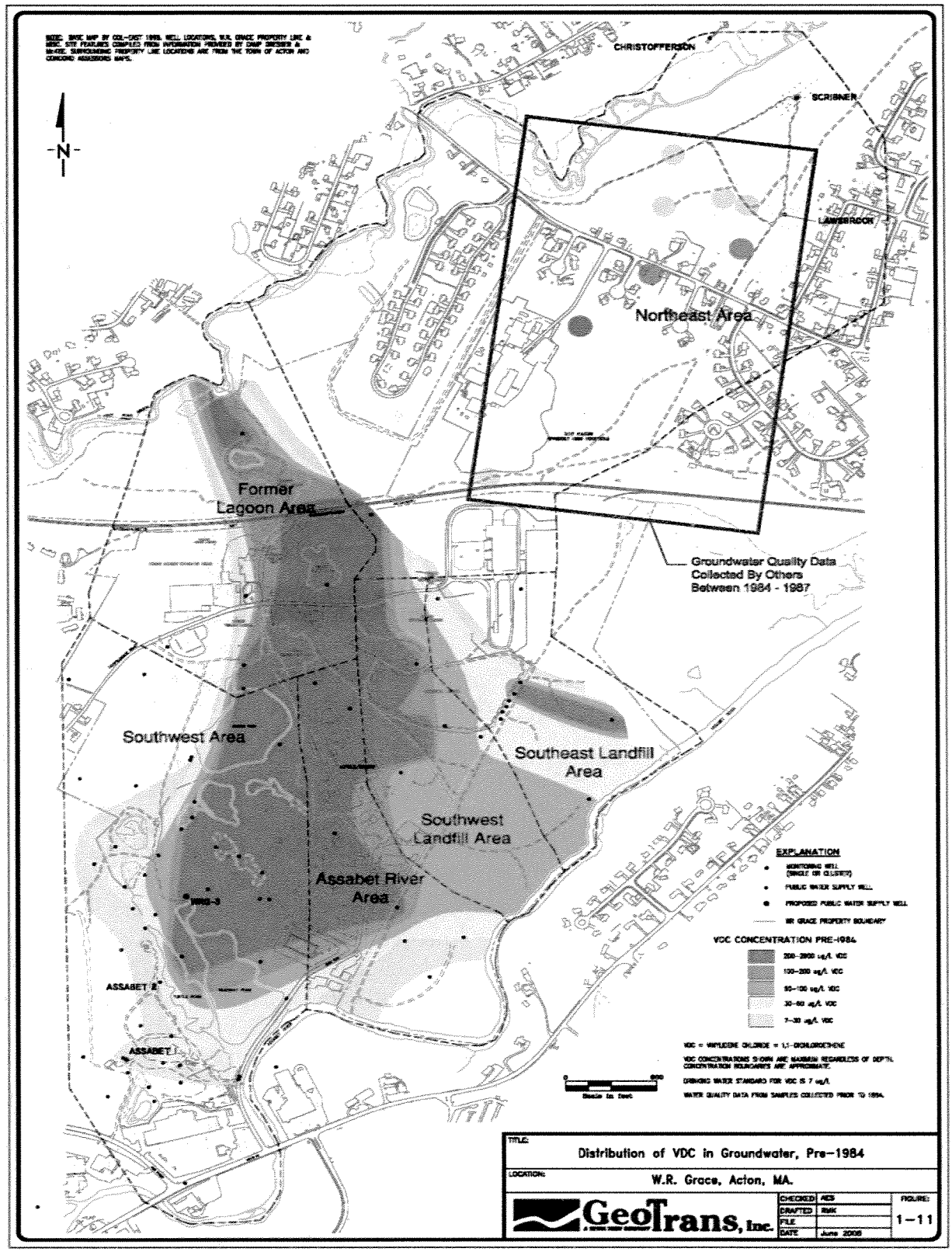


Figure 2: Distribution of VDC in Groundwater, Fall 2004

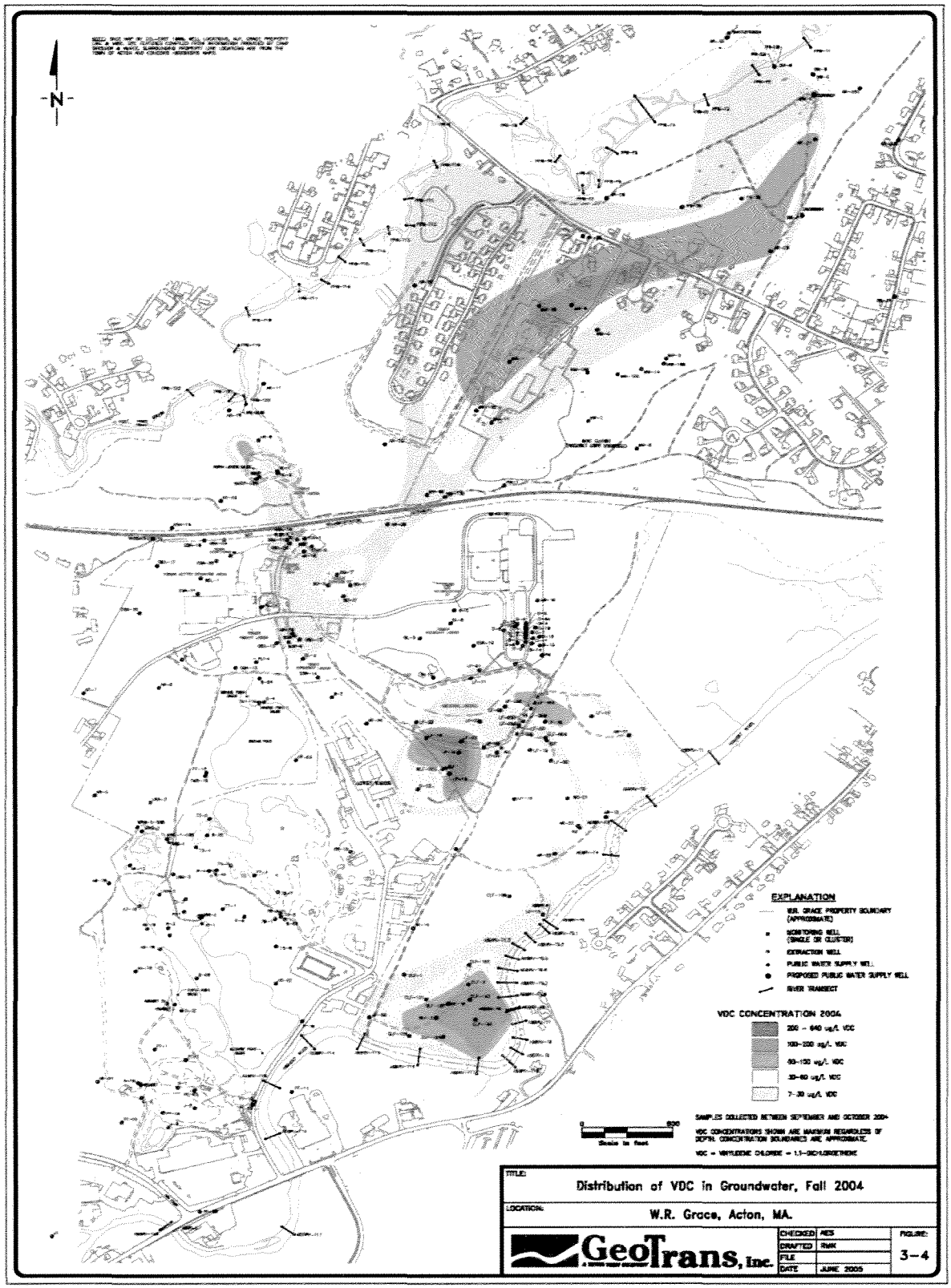
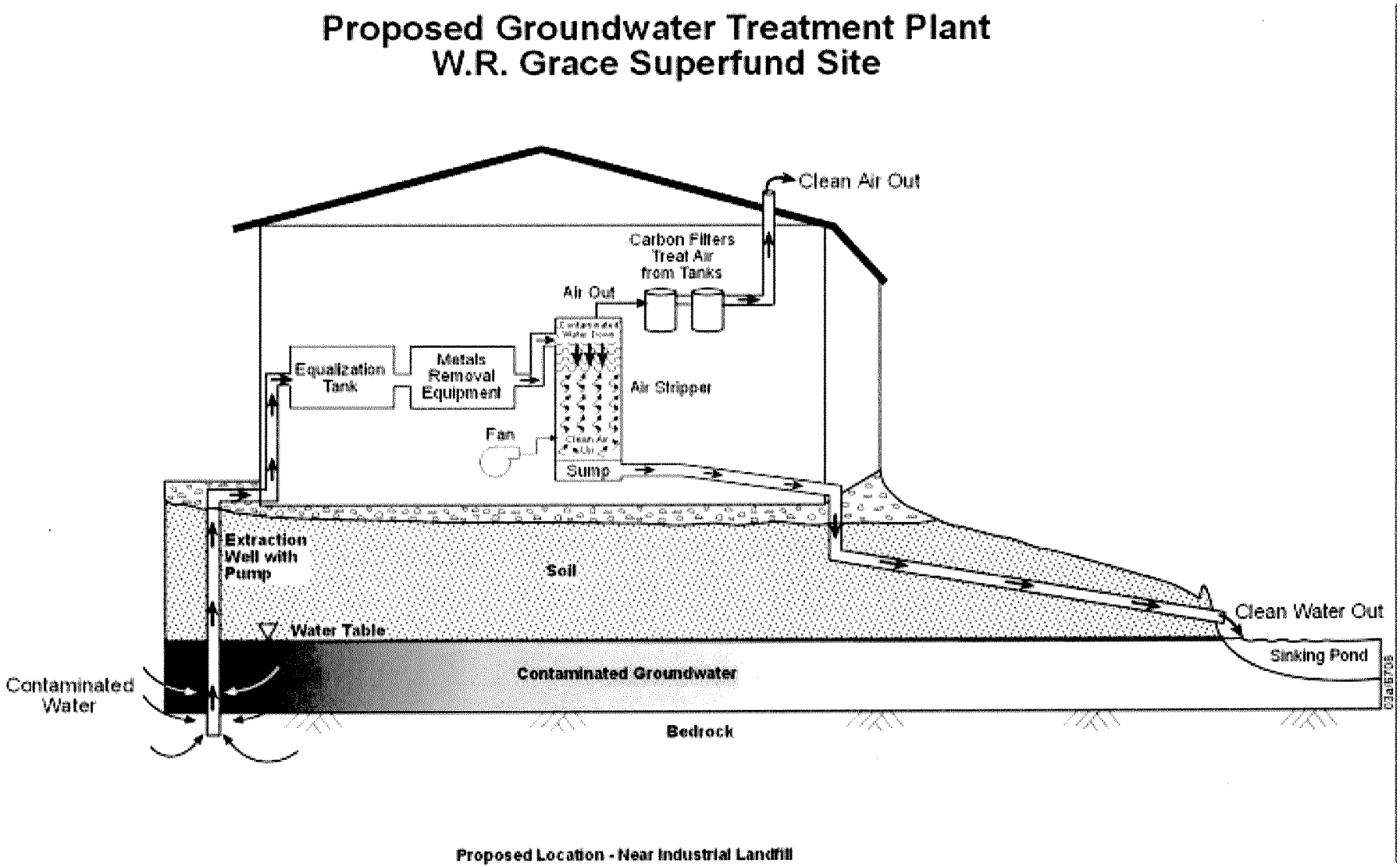


Figure 3.


Proposed Groundwater Treatment Plant
W.R. Grace Superfund Site
Clean Air Out
Carbon Filters
Treat Air
from Tanks
Air Out
Equalization
Tank
Metals
Removal
Equipment
Air Stripper
Fan
Sump
Extraction
Well with
Pump
Soil
Water Table
Clean Water Out
Sinking Pond
Contaminated
Water
Contaminated Groundwater
Bedrock
Proposed Location - Near Industrial Landfill

of the impacted area with indigenous species. Following excavation activities, wetlands will be enlarged, restored or replicated consistent with the requirements of the Federal and State wetlands protection laws. Although the RI did not identify any federal wetlands in the Sinking Pond area, should additional evaluations conclude otherwise, federal and state wetland requirements will be required to be met.

Executive Order 11988 (Protection of Flood plains) requires a determination that there is no practical alternative to taking federal actions in a flood plain area. Once that determination is made, the action taken must be designed or modified to minimize potential harm to or within the flood plain with the goal to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by flood plains. Sediments in a portion of the North Lagoon that pose an unacceptable human health and/or ecological risk are located in a flood plain. Through its analysis of the data collected in the RI as well as evaluations in the human health and ecological risk assessments, EPA has determined that because significant high level contamination exists in a portion of the flood plain in the North Lagoon Wetlands, there is no practical alternative to conducting work in the flood plain.

Once EPA determines that there is no practical alternative to conducting work in flood plain, EPA is then required to minimize potential harm to or within the flood plain. The proposed alternative for the North Lagoon Wetlands requires excavation and removal of sediments that pose an unacceptable risk in the flood plain. Once those sediments have been excavated, the flood plain area will be restored such that there is no lost flood storage capacity.

Cleanup Alternatives for the W. R. Grace (Acton Plant) Superfund Site

The Feasibility Study reviews various options or alternatives that EPA considers for cleanup at a Superfund site. During the upcoming public comment period, EPA welcomes your comments on this Proposed Cleanup Plan, the Public Review Draft Feasibility Study, Remedial Investigation and the Human Health and Ecological Risk Assessments. These alternatives are summarized below. Please consult the Feasibility Study for Operable Unit 3 for the W. R. Grace site which is is available at the Acton Memorial Library and EPA's Records Center in Boston for more detailed information.

EPA evaluated a number of cleanup alternatives. Only those alternatives that meet the threshold criteria of protectiveness and compliance with ARARs (excluding the No Action alternatives) are summarized below.

Sediment Cleanup Alternatives for Sinking Pond

Alternative SP-SED-1: No action
The no action alternative is required to be evaluated by EPA's Superfund regulations and is used throughout the FS process as a baseline for comparison to other clean up alternatives. This alternative does not consider any further clean up or monitoring at the site and does not include any costs.

★**Alternative SP-SED-3:** Active Remediation
Under this scenario, sediments that pose an unacceptable risk either to human health or to environmental receptors would be addressed. Sediments in the inlet would be removed and sediments in select portions of the Pond that are above the thermocline would be removed and/or capped. In addition, a new inlet would be constructed and the bank in the area of the former pump house will be replanted and restored. Excavated sediments would be dewatered and disposed of either on- or off-Site. This is the Preferred Alternative and is discussed in more detail elsewhere in this Proposed Plan.

★= EPA's Preferred Alternative

Sediment Cleanup Alternatives for the North Lagoon Wetlands

Alternative NLW-SED-1: No action

The no action alternative is required to be evaluated by EPA's Superfund regulations and is used throughout the FS process as a baseline for comparison to other clean up alternatives. This alternative does not consider any further clean up or monitoring at the site and does not include any costs.

★Alternative NLW-SED-3: Active Remediation

Under this alternative, all accessible sediments that pose risk to human health or the environment would be addressed through a combination of methods that may include excavation and either off-site disposal or on-site consolidation and capping. Wetlands would be restored, replicated and/or enlarged as appropriate, and monitoring for both environmental concerns and restoration/replicated wetland success would be conducted. This is the Preferred Alternative and is discussed in more detail elsewhere in this Proposed Plan.

Groundwater Cleanup Alternatives

Alternative GW-1: No action

The no action alternative is required to be evaluated by EPA's Superfund regulations and is used throughout the FS process as a baseline for comparison to other clean up alternatives. This alternative does not consider any further clean up or monitoring at the site and does not include any costs. This alternative assumes that the existing Aquifer Restoration System (ARS) would no longer be operating.

Alternative GW-2: Limited Action

This alternative, assumes the existing ARS would no longer be operational, and existing ARS extraction wells would be decommissioned. Under this alternative, institutional controls would be put in place to control human exposure to contaminated groundwater and natural attenuation would be relied upon to achieve remedial goals. Extensive groundwater monitoring would be done to verify the effectiveness of the remedy.

★ Alternative GW-3: Active Remediation

For this alternative, groundwater extraction wells, either existing ARS wells and/or new wells, would be used to capture groundwater within a specified area. Contaminated groundwater that is beyond the capture zone boundary would be remediated through natural attenuation processes. This alternative assumes that groundwater continues to be extracted and treated by the AWD. Groundwater from the extraction wells would be treated via air stripping for VOC removal and chemical precipitation for inorganics removal. Treated groundwater would be discharged to Sinking Pond. Institutional controls would be implemented to control human exposure to contaminated groundwater. Extensive groundwater monitoring would be done to verify the effectiveness of the remedy. This is the Preferred Alternative and is discussed in more detail elsewhere in this Proposed Plan.

Next Steps

This fall, EPA expects to have reviewed all comments, complete the Responsiveness Summary and sign a Record of Decision (ROD) document describing the chosen cleanup plan and clean up levels. The Record of Decision and a summary of responses to any public comments will then be made available to the public at the Acton Memorial Public Library reference desk and through EPA Records Center in Boston. EPA will announce the final decision on our cleanup plan through the local media and via our website.

A Closer Look at EPA's Proposal...

Sinking Pond

The Preferred Alternative for Sinking Pond sediments (Alternative SP-SED-3) includes excavation of the sediments from the Sinking Pond inlet as well as removal and/or covering of sediments from select portions of the Pond that are above the thermocline (12 feet of water or less) and considered to pose an unacceptable risk to either human health or to environmental receptors.

The decision regarding whether to remove and/or cap/cover sediment within the Pond depends upon the steepness of the slopes of the Pond. It is assumed that maximum sediment removal depth would be no greater than one foot, throughout much of Sinking Pond, but may be as much as six feet in limited areas near the inlet. Additional data will need to be collected as part of the remedial design phase to determine these specific details.

Clean up work within the Pond would require construction of temporary floating docks, while access to the Sinking Pond area would require construction of temporary roads. Sediments would be excavated and moved by pumped pipeline or truck to a temporary staging area on the Grace property for dewatering, analysis for disposal waste profile characterization, and ultimately preparation for disposal. It is currently assumed that the dewatering process can be conducted within the general location of the current inlet area to minimize impacts to other areas of the pond. Off-site disposal of dewatered sediments is anticipated. However, based on the results of the waste profile characterization, consideration would be given to on-site consolidation and capping of recovered sediments.

The inlet and select pond excavation areas would require restoration by a qualified company in accordance with applicable standards. Assuming that discharges of treated groundwater to the pond will continue (see groundwater discussion below), the inlet would be redesigned to slow down the flow of treated water entering Sinking Pond. The mouth from the inlet to the Pond would be widened, and a hydraulic control, such as an overflow weir, would be installed. The purpose of these steps is to provide increased retention time for settling of suspended particles before the treated groundwater is discharged to the Pond and to reduce the energy of water when it enters the Pond. During this construction period, the area of the bank adjacent to the former Pump House would also be rehabilitated by a qualified restoration expert. A long term environmental monitoring program will also be established as part of this alternative. In addition, every five years a remedy review would be conducted. The total estimated present worth cost of this alternative is $5,961,000. The capital costs were estimated to be $5,730,000. The present worth cost for implementing long term monitoring and maintenance and five year reviews was estimated to be $231,000.

North Lagoon Wetlands

The Preferred Alternative for the North Lagoon Wetlands (Alternative NLW-SED-3) would address sediments within the North Lagoon Wetland that pose risks to either human health or environmental receptors. Remediation may include excavation, off-site disposal and/or consolidation and capping on-site. This alternative requires excavation of at least a portion of the impacted sediments in the North Lagoon Wetland. It is anticipated that some excavation will be required in the portion of the North Lagoon Wetland sediments that reside within the 100-year flood plain of Fort Pond Brook. Consideration will be given to consolidation and capping in place for North Lagoon Wetland sediments in an area outside of the 100-year flood plain. Decisions regarding excavation/consolidation/capping and on- or off-site disposal will be made during the design-phase and will take into consideration, characteristics of the excavated material, implementability factors as well as a functionality assessment of certain portions of the wetland.

It is assumed that maximum sediment removal depth would be no greater than one foot in most areas, and that much of the wetland area would

either be removed or destroyed in the removal effort. Work within the wetland using heavy equipment would require either construction of temporary roads or load-distributing floating platforms from which to excavate. Sediments would be excavated and moved by truck to a temporary staging area on the Grace property for dewatering, analysis for disposal waste profile characterization, and ultimately preparation for disposal. The wetland would require complete restoration in accordance with industry standards, by a qualified company which would include proper sediment restoration planning, planting plans, long term monitoring to determine the success of revegetated areas, and follow up construction work as warranted by the relative success of the restored/replicated wetland.

An environmental monitoring program would also be established be to assess the success of the restored wetland and to evaluate the North Lagoon Wetland area for signs of re-deposition of significant concentrations of arsenic and manganese. The total estimated present worth of this alternative is $3,445,000. The capital costs for excavation and disposal of sediments from, and restoration of the North Lagoon Wetland was estimated to be $3,382,000. The present worth cost for implementing long term monitoring and maintenance was estimated to be $62,000.

Groundwater

To address groundwater contamination, the existing Aquifer Restoration System will be redesigned and/or modified to include treatment of metals contamination (in addition to air stripping and carbon adsorption for organic contamination) prior to discharge to Sinking Pond.

Based on the results of treatability testing done at the Site for inorganic compound removal and the historic operational performance of the current VOC removal technology, chemical precipitation for the removal of inorganic compounds and air stripping coupled with off-gas treatment using granular activated carbon (GAC) for the removal of VOCs would be used to treat the groundwater. The treated water would be discharged to Sinking Pond.

Based on the results of extensive groundwater modeling, the capture zone(s) of the system will focus on extraction and treatment of groundwater in the vicinity of the Industrial Landfill (the Southwest and Southeast Landfill areas). Other areas of groundwater contamination not captured by the extraction system will be addressed by monitored natural attenuation (MNA) and/or gradient flushing that is enhanced by the continued pumping and treatment at the AWD's School Street Wellfield.

Continued groundwater monitoring will be required as part of this alternative. Furthermore, to ensure protection of the Town's water supply wells in the School Street Wellfield, an extensive network of monitoring wells between the area of highest groundwater contamination and the Wellfield, as well as the area downgradient of the Town's supply wells (to ensure that contamination is not being allowed to extend beyond that area), will likely be required.

In addition to long-term monitoring, institutional controls will be needed to prohibit installation of drinking water or irrigation wells in contaminated areas until the remedial goals are achieved. The estimated present worth cost of the groundwater component of the proposed cleanup is $7,536,000. The estimated capital costs are $2,651,000. The present worth for long-term monitoring is approximately $1,722,000. The present worth for operation and maintenance is approximately $3,163,000. See **Focus on Groundwater** below for more detailed information on the proposed groundwater cleanup.

Focus on Groundwater: How was the Active Treatment alternative developed?

An extensive analysis in the Feasibilty Study was conducted in developing the Active Remediation Alternative for Groundwater (Alternative GW-3). In all groundwater extraction scenarios evaluated, the fact that groundwater extraction and treatment

has been operational over much of the Site for almost 20 years was indirectly incorporated into the model analyses. As discussed previously, over the last 20 years there has been significant removal and reduction of VOCs from groundwater. (See Figures 1 and 2- Maps from 1984 and 2004) The findings of that analysis are briefly summarized below.

Substantial in-depth analysis and modeling went into the development of the Active Remediation Alternative for groundwater. The groundwater flow and contaminant transport model was used to evaluate numerous pumping scenarios throughout the Site in order to select components of the Active Remediation Alternative. Consideration was given to the time to reach clean up goals, reduction in volume, implementability and cost among other factors. Six separate areas of the site were evaluated using the groundwater flow model. These areas, as shown on Figure 2 were the Former Lagoon Area, the Southwest Area, the Assabet River Area, the Southwest Landfill Area, the Southeast Landfill Area, and the Northeast Area.

- **Former Lagoon Area**

Two pumping scenarios were evaluated for the Former Lagoon Area. Analysis of the model results indicates that groundwater extraction under either pumping scenario would not reduce the time to reach the cleanup goals for VOCs as compared to the Limited Action Alternative. Model analyses also indicate that the Assabet Public Water Supply Wells will not become recontaminated as a result of cessation of pumping in the Former Lagoon Area. Further study was also done to evaluate the potential for metals contamination (arsenic) to recontaminate the North Lagoon Wetlands, which are also slated for cleanup under this proposal. Based upon the results of this study, the potential to re-contaminate the North Lagoon Wetland sediments as a result of site-related contaminated groundwater will also decrease. As a result, pumping is not recommended in this area.

Southwest Area:

Groundwater extraction in the Southwest Area was not considered for the groundwater extraction system presented in this alternative. Little or no VOC contamination above drinking water standards remains in the Southwest Area groundwater. Because prior active pumping along with natural processes has reduced contaminant concentrations to very low levels, the MNA component of this remedial alternative is appropriate for the remaining cleanup in this area of the Site.

- **Assabet River Area**

One pumping scenario was considered for the Assabet River Area. Model calculations indicate that cleanup time under active pumping is the same as the predicted cleanup time under the Limited Action Alternative. In addition, given that current groundwater discharge to the Assabet River does not pose an unacceptable risk to human health or the environment active management of the groundwater contamination in this area is not necessary. Therefore, groundwater extraction in this area is not included as part of this remedial alternative.

- **Southwest Landfill Area**

Two pumping scenarios were considered for the Southwest Landfill Area. Both scenarios would limit the migration of contaminated groundwater to the Assabet River and prevent the area between the Industrial Landfill and the Assabet River, for which remedial goals have been achieved, from becoming re-contaminated. This alternative would reduce the time to achieve remedial goals from approximately 42 years under the Limited Action Alternative to approximately 23 years under the active treatment pumping scenario. For this reason, groundwater extraction in this area of the site is included as a component of this remedial alternative.

- **Southeast Landfill Area**

Two pumping scenarios were also considered for the Southeast Landfill Area. A comparison of the two pumping scenarios indicates that neither pumping scenario reduces clean-up times for VOC-contaminated groundwater as compared to the Limited Action Alternative. However, continued groundwater extraction in this area is necessary to provide hydraulic containment of

groundwater with highly elevated arsenic concentrations. Therefore, groundwater extraction is included as a component of this remedial alternative.

- **Northeast Area**

The most in-depth evaluation of groundwater extraction scenarios in the Feasibility Study was conducted for the Northeast Area. Four different pumping scenarios were evaluated for the Northeast Area. Two of the pumping scenarios considered groundwater extraction with discharge of treated water to Sinking Pond and two of the scenarios considered groundwater extraction with downgradient reinjection of the treated water back into the Northeast Area.

Development of the pumping scenarios for the Northeast Area required consideration of two issues not present in other areas of the Site. One issue was the management of the extracted and treated groundwater. The second issue was the time frame necessary for an extraction/injection system to be constructed and become operational.

Management of extracted groundwater is an issue here because under current conditions, contaminated groundwater in the Northeast Area flows toward and discharges to Fort Pond Brook and/or flows toward and is captured and treated at the School Street Wellfield. Installation of extraction wells in the Northeast Area has the potential to lower water levels in the vicinity of the School Street Wellfield thereby reducing the amount of water available to the community. Because of potential adverse impacts on the Town's water supply wells, the two pumping scenarios that do not include reinjection would likely be unacceptable.

To off-set this potential impact, the evaluation of extraction scenarios included two scenarios that assumed that extracted groundwater would be re-injected to the aquifer in the Northeast Area instead of being discharged to Sinking Pond to minimize impacts to the Town wells. Although reinjection was included in the evaluation to address concerns that groundwater clean up could adversely affect the volume of water available to the community, reinjection presented another issue in that reinjection of treated water to the Northeast Area could cause biogeochemical changes resulting in well-fouling and/or aquifer clogging either at the injection well or in the aquifer. The former affects the viability of the injection well and the latter could potentially affect the School Street Wellfield, i.e., mobilize inorganics towards wellfield. These problems were also considered as part of the decision making process.

Time frame for construction is also an issue because with very limited Grace owned land located within the Northeast Area, extraction/injection system infrastructure would need to be located on privately-owned land, and access agreements would need to be obtained for the construction, operation, and monitoring of any extraction/injection system in the Northeast Area. Reaching these agreements can take considerable time. As a result, it was optimistically assumed that if an extraction/injection system were selected for the Northeast Area that it could be designed, approved, constructed and be operational by fall 2008. Fall 2008 is seven years after the fall 2001 data that was used as the baseline condition in the FS for the model analyses. Therefore, for all remedial scenarios considered for the Northeast Area, an initial seven year period was assumed to occur prior to operation of any extraction/injection wells. During this seven year period, contaminant concentrations would continue to be reduced through natural processes. As a result, model-calculated time frames to reach groundwater cleanup goals for all scenarios include this seven year period of attenuation.

Section 6.1 of the Feasibility Study provides detailed information on the various pumping scenarios evaluated. In short, the model-calculated time to reach drinking water standards (MCLs) for this area under the four active pumping scenarios ranged from 17 to 36 years, as compared to 25 years under the scenario involving continued flushing of the aquifer under current conditions. Cost estimates for the active pumping scenarios in this area ranged from $3.5 million to $8 million.

In evaluating the time frame for clean up under the four scenarios included in the Feasibility Study for the Northeast Area, EPA attempted to factor

into its evaluation issues raised by the Town, the AWD and concerned citizens regarding the impact that contamination in the Northeast Area has on the Town's drinking water supply. To aid in this evaluation, the Feasibility Study includes an estimate of the time frame within which concentrations of contaminants would be reduced to acceptable levels (MCLs) in the area close to the School Street Wellfield. Although MCLs will not immediately be met, the groundwater flow model indicates that in a few years (close in time to the earliest date by which a treatment system could be put in place in the Northeast Area), the concentration of VDC in the School Street public supply wells (as opposed to groundwater in other areas in the northeast plume) will be less than or equal to the safe drinking water standard (MCL) of 7 ppb (µg/l). Because this model has provided a reasonably good representation of VDC concentrations in these wells during the past four year EPA believes this is a reasonable estimate of the time frame to meet this important clean up requirement.[1]

Considering the implementation difficulties associated with groundwater extraction and treatment in this area, the small amount (24 gallons) of VDC remaining in the groundwater in this area of the Site, the limited impact that treatment would have on both the mass removal of VDC and the time it would take to achieve MCLs, and the costs associated with the pumping scenarios, groundwater extraction and treatment in the Northeast Area is not included as a component of this remedial alternative.

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The maximum model-calculated VDC concentration that is likely to occur in the public supply wells between now and when cleanup levles are expected to be met is about 15 µg/l which is considerably less than the School Street Wellfield treatment system is capable of removing. It is EPA's understanding that the School Street Wellfield treatment system is able to remove VDC concentrations of approximately 600 µg/L.

Evaluation of Alternatives

EPA uses nine criteria to balance the advantages and disadvantages of various cleanup alternatives. As described below, EPA has evaluated how well each of the cleanup alternatives meets the first seven criteria. Once comments from the state and the community are received and considered, EPA will select the final cleanup plan.

Comparative Analysis of Remedial Alternatives for Groundwater

Overall Protection of Human Health and the Environment

Alternative GW-1, No Action, would be the least protective of the three alternatives. It would offer no protection to human health and the environment. Potential risks from exposure to contaminated groundwater would remain. While natural attenuation processes would eventually reduce contaminant concentrations in groundwater to remedial goals, no monitoring would be done to indicate when they are met. Alternative GW-2, Limited Action, would provide greater protection than Alternative GW-1 because institutional controls would be implemented to restrict the use of contaminated groundwater. In addition, long-term groundwater monitoring would be done to verify the continued protection of human health and the environment, identify the then-current distribution of contamination, and document the progress toward reaching remedial goals. The time to reach remedial goals site-wide is estimated to be 42 years, and would be the same under Alternative GW-1 or GW-2. The combination of institutional controls and natural attenuation is considered to be protective of human health and the environment. Alternative GW-3, Active Remediation, would also be protective of human health and the environment. Similar to Alternative GW-2, institutional controls would be implemented to restrict the use of contaminated groundwater and long-term groundwater monitoring would be conducted to verify the continued protection of human health and the environment, identify the then-current distribution of contamination, and document the progress toward reaching remedial

goals. The time to reach remedial goals Site-wide is estimated to be 42 years, and would be the same under Alternative GW-1 or GW-2. The combination of institutional controls and natural attenuation is considered to be protective of human health and the environment. Alternative GW-3, Active Remediation, would also be protective of human health and the environment. Similar to Alternative GW-2, institutional controls would be implemented to restrict the use of contaminated groundwater and long-term groundwater monitoring would be conducted to verify the continued protection of human health and the environment, identify the then-current distribution of contamination, and document the progress toward reaching remedial goals.

Groundwater extraction with ex-situ treatment would decrease the time to reach remedial goals Site-wide to 26 years and is therefore provides greater overall protection than Alternatives GW1 and GW-2.

Compliance with ARARs

Each of the alternatives would attain remedial goals in the long term. Alternative GW-3 would attain ARARs more quickly than Alternatives GW-1 and GW-2.

Long-term Effectiveness and Permanence

Alternative GW-1 would provide the least long-term effectiveness because there would be no controls put in place to limit access to contaminated groundwater. Alternative GW-2 would be more effective than Alternative GW-1 because institutional controls would be implemented to limit access to contaminated groundwater. Alternative GW-3 provides the greatest long term effectiveness and permanence because, in addition to limiting access to contaminated groundwater, it requires treatment that permanently destroys contaminants in groundwater. All three alternatives would permanently reduce contaminant concentrations to remedial goals; however GW-3 provides greater permanence in a shorter time frame.

Reduction of Toxicity, Mobility, or Volume

All three alternatives would reduce toxicity and volume of contamination through natural attenuation processes. Alternative GW-3, however, also provides active containment and treatment of contaminated groundwater, which would reduce the mobility, volume, and toxicity of contaminants by treatment.

Short-Term Effectiveness

See the section entitled **What impacts would the Cleanup have on the local community?** for information on short-term impacts.

Implementability

Alternative GW-1 could be readily implemented. The institutional controls required for either Alternative GW-2 or Alternative GW-3 may present some implementation issues that would effect the time frame to have institutional controls/deed restrictions in place. The groundwater extraction and treatment planned under Alternative GW-3 is a frequently used and effective remedial alternative. All aspects of the proposed extraction and treatment system are standard. Alternative GW-3 would require long-term maintenance to remain effective.

Cost

Alternative GW-1 is the least costly. Alternative GW-2 is more expensive than Alternative GW-1. Alternative GW-3 is the most costly.

Comparative Analysis of Remedial Alternatives for Sinking Pond

Overall Protection of Human Health and the Environment

Alternative SP-SED-1, No Action, does not provide overall protection of human health and the environment. Potential risks from exposure to contaminated sediments would remain. While natural attenuation processes might reduce contaminant concentrations in sediments to remedial goals in a very long time frame, no

monitoring would be done to indicate whether or when they are met. Alternative SP-SED-3, Active Remediation, provides overall protection of human health and the environment by excavating and removing and/or by covering or capping contaminated sediments that present an unacceptable risk to human health and the environment. Institutional controls would be required in the form of a deed restriction if the final plan incorporates capping of impacted sediments as part of the remediation strategy.

Compliance with ARARs

Both the No Action Alternative (SP-SED-1) and Alternative SP-SED-3, Active Remediation, will meet ARARs.

Long-term Effectiveness and Permanence

Alternative SP-SED-1, No Action, would not provide long term effectiveness or permanence. Alternative SP-SED-3, Active Remediation, provides the greatest level of long-term effectiveness and permanence by virtue of having impacted sediments permanently removed from the areas of concern or made inaccessible to sensitive receptors by capping.

Reduction of Toxicity, Mobility, or Volume

The No Action Alternative (SP-SED-1) would not reduce toxicity, mobility or volume except to the extent that natural processes occur. To the extent that materials are excavated and taken off-site for disposal, toxicity, mobility and volume are reduced but not through treatment.
Alternative SP-SED-3 would reduce toxicity, mobility and volume but not through treatment to the extent that materials are excavated and taken off-site for disposal. To the extent that some of the target sediments within the Pond may be capped under this alternative, there would be no reduction in volume however, there will be some reduction in potential toxicity and mobility but not through treatment by virtue of having sediments no longer exposed to surface activities.

The Nine Criteria for Choosing a Cleanup

EPA uses nine criteria to balance the pros and cons of cleanup alternatives. EPA has already evaluated how well each of the cleanup alternatives developed for the W. R. Grace Superfund site meets the first seven criteria (See tables on pages 7 and 9). Once comments from the state and the community are received, EPA will select the cleanup plan.

1. **Overall protection of human health and the environment:** Will it protect you and the plant and animal life on and near the site? EPA will not choose a plan that does not meet this basic criterion.
2. **Compliance with Applicable or Relevant and Appropriate Requirements (ARARs):** Does the alternative meet all federal and state environmental statutes, regulations and requirements?
3. **Long-term effectiveness and permanence:** Will the effects of the cleanup plan last or could contamination cause future risk?
4. **Reduction of toxicity, mobility or volume through treatment:** Does the alternative reduce the harmful effects of the contaminants, the spread of contaminants, and the amount of contaminated material?
5. **Short-term effectiveness:** How soon will site risks be adequately reduced? Could the cleanup cause short-term hazards to workers, residents or the environment?
6. **Implementability:** Is the alternative technically feasible? Are the right goods and services (i.e. treatment machinery, space at an approved disposal facility) available for the plan?
7. **Cost:** What is the total cost of an alternative over time? EPA must find a plan that gives necessary protection for a reasonable cost.
8. **State acceptance:** Do state environmental agencies agree with EPA's proposal?
9. **Community acceptance**: What objections, suggestions or modifications does the public offer during the comment period?

Short-Term Effectiveness

See the sections entitled **What impacts would the Cleanup have on the local community?** and **Impacts to the Flood plain and Wetlands** for information on short-term impacts.

Implementability

Because the No Action Alternative (SP-SED-1) does not require any activities to take place, it does not present any implementation issues. The technology for Alternative SP-SED-3 is commonly used and readily available. The primary site constraints applicable to work in the Sinking Pond area are that work in and around the Pond is cumbersome and arduous. The most challenging technical issues involve removal of sub-aqueous sediments (SP-SED-3) and restoration of the inlet area. However, this Alternative is reasonably implementable.

Cost

The No Action alternative (SP-SED-1) is the least costly alternative and SP-SED-3, Active Remediation, is the most costly.

Comparative Analysis of Remedial Alternatives for North Lagoon Wetland

Overall Protection of Human Health and the Environment

Alternative NLW-SED-1, No Action, would not provide overall protection of human health and the environment. Potential risks from exposure to contaminated sediments would remain. While natural attenuation processes might reduce contaminant concentrations in sediments to remedial goals in a very long time frame, no monitoring would be done to indicate whether or when they are met. Alternative, NLW-SED-3, Active Remediation, provides overall protection of human health and the environment by excavating and removing and/or by covering or capping contaminated sediments that present an unacceptable risk to human health and the environment. Institutional controls would be required in the form of a deed restriction if the final plan incorporates capping of impacted sediments as part of the remediation strategy.

Compliance with ARARs

Both the No Action Alternative (NLW-SED-1) and Alternative NLW-SED-3, Active Remediation, will meet ARARs.

Long-term Effectiveness and Permanence

Alternative NLW-SED-1, No Action, would not provide long-term effectiveness or permanence and the residual contamination that remains is high. The alternative that incorporates removal or isolation of all sediments that pose risk to humans and the environment, NLW-SED-3, Active Remediation, provides the greatest level of long-term effectiveness and permanence by virtue of having all impacted sediments removed from the area of concern or made inaccessible to sensitive receptors by capping.

Reduction of Toxicity, Mobility, or Volume

The No Action Alternative (NLW-SED-1) would not reduce toxicity, mobility or volume except to the extent that natural processes occur. Alternative NLW-SED-3 would reduce toxicity, mobility and volume but not through treatment to the extent that materials are excavated and taken off-site for disposal. To the extent that some of the target sediments may be capped under this alternative, there would be no reduction in volume however, there will be some reduction in potential toxicity and mobility by virtue of having sediments no longer exposed to surface activities.

Short-Term Effectiveness

See the sections entitled **What impacts would the Cleanup have on the local community?** and **Impacts to the Flood plain and Wetlands** for information on short-term impacts.

Implementability

Because the No Action Alternative (NLW-SED-1) does not require any activities to take place, it does not present any implementation issues. The technology for Alternative NLW-SED-3 is

commonly used and readily available. The primary site constraint applicable to work in the North Lagoon Wetland area is that work in and around the wetlands is cumbersome and arduous. However, this Alternative is reasonably implementable.

Cost

The No Action alternative (NLW-SED-1) is the least costly alternative. The remaining alternative, NLW-SED-3, is the most costly.

For all remedial alternatives evaluated, two additional criteria will be addressed at the conclusion of the public comment period, they are:

State Acceptance

The Massachusetts Department of Environmental Protection (MADEP) has reviewed the Feasibility Study prior to the issuance of this Proposed Plan.

Community Acceptance

Community acceptance will be evaluated based on comments received during the 30 day formal comment period.comment received during the 30-day formal comment period.

EPA will accept written comments and hold a **public hearing on August 4, 2005**, to accept formal verbal comments.

To learn more and provide comment.

Find out about the proposed cleanup plan and how it compares with other cleanup options for the site at an **informational public meeting at 7:30 pm on Tuesday, July 19, 2005.** At the meeting, EPA will respond to your questions and concerns about the proposed cleanup and how it may affect you. For further information on the meeting, call EPA Community Involvement Coordinator Sarah White at 617-918-1026.

EPA is accepting **public comment on this proposal from Monday, July 11, 2005 through Tuesday, August 9, 2005**. You don't have to be a technical expert to comment -- if you have a concern or preference EPA wants to hear it before making a final decision on how to protect your community. To comment formally:

Offer oral comments during the public hearing on Thursday, August 4, 2005,

Send written comments postmarked no later than August 9, 2005 to:

Derrick Golden
EPA Remedial Project Manager
U.S. Environmental
Protection Agency
Region I, HBO
One Congress Street
Boston, MA 02114-2023

E-mail or fax comments by August 9, 2005 to:
Derrick.Golden @epa.gov FAX: 617/918-1291

What is a Formal Comment?

During the 30-day formal comment period, EPA will accept formal written comments and hold a hearing to accept formal verbal comments. EPA use public comments to improve the cleanup proposal.

To make a **formal** comment, you need only speak during the public hearing on Thursday, August 4, 2005 or submit a written comment during the comment period.

Federal regulations require EPA to distinguish between "formal" and 'informal" comments. While EPA uses your comments throughout the site investigation and cleanup, **EPA is required to respond to formal comments in writing only. EPA will not verbally respond to your comments during the formal hearing on August 4th**

EPA will review the transcript of all formal comments received at the hearing, and all written comments received during the formal comment period, before making a final cleanup decision. EPA will then prepare a written response to all formal written and oral comments received.

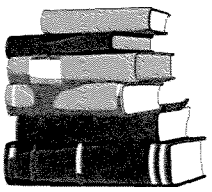
Your formal comment will become part of the official public record. The transcript of comments and EPA's written responses will be issued in a document called a Responsiveness Summary when EPA releases the final cleanup decision.

For More Detailed Information

To help the public understand and comment on the proposal for the site, this publication summarizes a number of reports and studies. All of the technical and public information publications prepared to date for the site are available at the at these W.R. Grace Superfund site information repositories:

Acton Memorial Library
486 Main Street
Acton, MA
Phone 978-264-9641
Web site: www.actonmemoriallibrary.org/

EPA Records Center
One Congress Street
Boston, MA 02114
(617) 918-1440
Hours: 10:00 am-noon and 2:00 pm-5:00 pm



In accordance with the Comprehensive Environmental Response, Compensation and Liability Act, (Section 117) the law that established the Superfund program, this document summarizes EPA's cleanup proposal. For detailed information on the options evaluated for use at the site, see the W.R. Grace Superfund site Feasibility Study available for review at the information repositories at the Acton Public Library and at EPA's One Congress Street Office in Boston